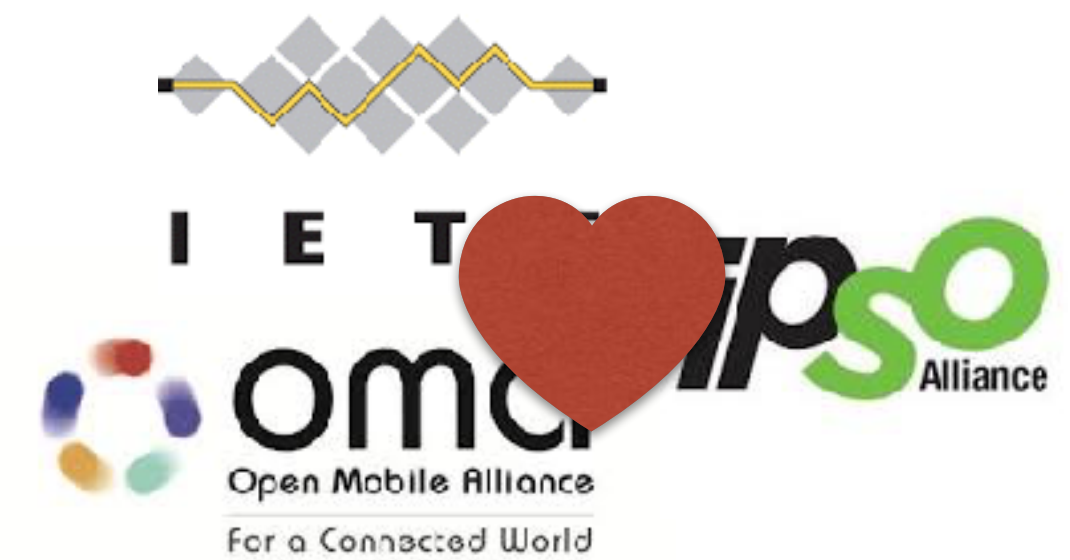


# OMA, IPSO & IETF CoRE



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IPSO Smart Objects chair



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OMA F2F - Warsaw



# Standards built on each other

## IoT Standards That Build On Each Other

2014

- CoAP and related standards from IETF
  - REST API for constrained networks and devices
  - HTTP Proxy provides abstraction through standard web APIs
  - Core-link-format (RFC 6690) provides semantic descriptors in the form of web links
  - Resource Directory provides an API for scalable discovery and linking using core link-format mediatype
- OMA LWM2M is based on CoAP
  - Provides a server profile for IoT middleware
  - Defines a simple reusable object model
  - Defines management objects and reuses REST API for onboarding and device life cycle management
- IPSO Smart Objects are based on OMA LWM2M
  - Defines application objects using the LWM2M Object Model
  - Complex objects can be composed from simple objects
  - Easy to add new resource and object types as needed

# IPSO Smart Objects

- Based on the LWM2M Object Model but for Application Data.
- Domain-specific objects created by vendors themselves.
- Provides a consistent Design Pattern and Reusable Resource Definitions.
- Non-mandatory resources can be modified, new Objects can easily be added and automatically validated.
- Released Objects are registered in OMNA and use the standard OMA DDF (XML) object descriptors.
- 53 Objects (temperature, ... stopwatch), registered with OMNA and 100 Reusable Resources.
- Openly available and easy to contribute: <http://ipso-alliance.github.io/pub>

# IPSO Smart Objects

- Object representation as in LWM2M

`<object ID>/<object instance ID>/<resource ID>`

- URI

`coap://device1.example.com/3303/0/5700`

`3300` -> Temperature Sensor

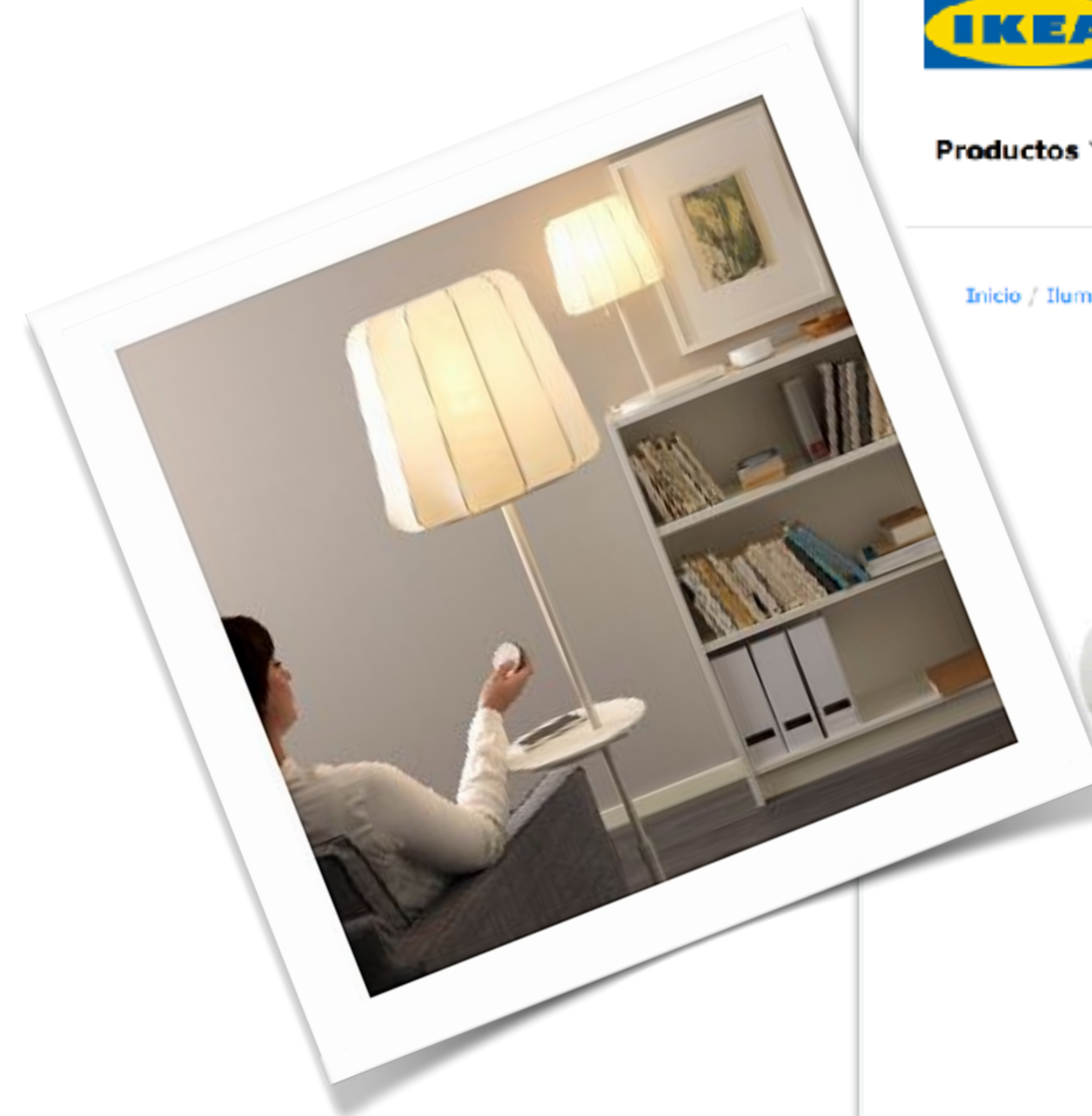
`0` -> instance 0 of a Temperature Sensor


`5700` -> resource having the current value or a most recent reading

- Implemented in Wakaama, Leshan, Contiki, LWMQN, BIPSO and products that use LWM2M.
- Available in multiple IoT OS: Contiki, RIOT, Mbed, Zephyr...




# IKEA TRÅDFRI





[Productos](#) [Estancias](#) [Novedades](#) [Promociones](#) [Inspiración](#)

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### TRÅDFRI

Kit entrada, espectro blanco, blanco

**€ 79,99** / ud

(€ 65,11 Sin IVA)

[Ficha del producto](#)

*IVA incluido*

Referencia artículo: 803.389.50

El kit TRÅDFRI incluye una pasarela, un mando a distancia, dos bombillas led E27 (casquillo grande) de espectro blanco para ponértelo fácil.

Cantidad

1

Comprar


Consulta la disponibilidad en tu tienda IKEA

Tienda: Elige

Los precios que aparecen en nuestra web son orientativos pudiendo variar, al alza o a la baja, en cada tienda.

[Compra online](#) [Planificador de dormitorios](#)

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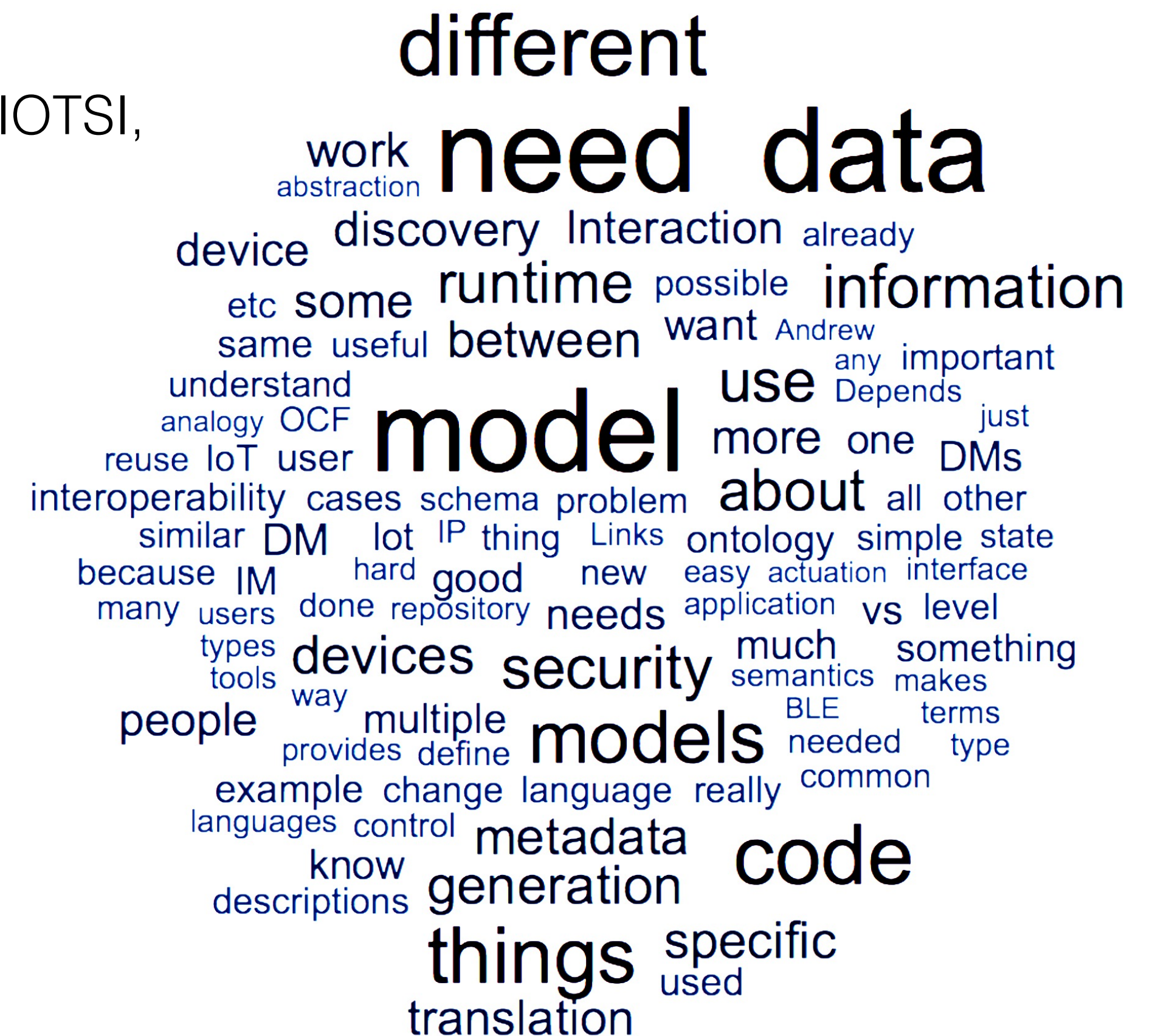






# Possible Future Work

- Alignment with other SDOs (OCF, WoT, Schema.org...).
- Alignment with the community through IAB Workshops (IOTSI, WISHI)
- Web links + RFC6690 + Link JSON/CBOR
  - Weblinks
  - Link Relations and Anchors.
  - Link Attributes (LWM2M has some already)
  - Compact Serialisation
- Support for `/ .well-known/core`
- Support for Web Forms.
  - <https://tools.ietf.org/html/draft-hartke-t2trg-coral-00>
  - <https://tools.ietf.org/html/draft-koster-t2trg-hsml-01>



*IOTSI Workshop  
most common words.*

# IETF and IoT Work

- IETF's role: Specify the underlying, fundamental Internet Technologies.
- “Permissionless innovation” - so that others can build on top.

LWIG (Guidance)	DICE (DTLS)	6LoWPAN (802.15.4)
COSE (Object Security)	ROLL (RPL routing)	6Lo (IP-over foo)
ACE	6TiSCH	Architectural oversight (IAB)
CoRE (CoAP + extras)	CBOR (Constrained Binary Object)	LPWAN
		T2TRG (Research)



# IETF CoRE WG

- 12 documents that are WG items.
- Base of current LWM2M.
- Addressing CoAP protocol, security, linking, discovery, congestion control, data serialisation, modelling in YANG, HTTP Proxying, Publish-Subscribe...
- Some of them recently updated like Resource Directory or CoAP over TCP.
- More drafts on the pipeline ...

Working Group Documents:

<u>Draft name</u>	<u>Rev.</u>	<u>Dated</u>	<u>Status</u>	<u>Comments, Issues</u>
<i>Active:</i>				
<a href="#">draft-ietf-core-coap-pubsub</a>	-02	2017-07-03	Active	
<a href="#">draft-ietf-core-cocoa</a>	-02 <i>new</i>	2017-10-30	Active	
<a href="#">draft-ietf-core-comi</a>	-01	2017-07-18	Active	
<a href="#">draft-ietf-core-dynlink</a>	-04	2017-09-14	Active	
<a href="#">draft-ietf-core-echo-request-tag</a>	-00 <i>new</i>	2017-10-30	Active	
<a href="#">draft-ietf-core-interfaces</a>	-10	2017-09-14	Active	
<a href="#">draft-ietf-core-object-security</a>	-06	2017-10-25	Active	
<a href="#">draft-ietf-core-rd-dns-sd</a>	-00	2017-07-03	Active	
<a href="#">draft-ietf-core-resource-directory</a>	-12 <i>new</i>	2017-10-30	Active	
<a href="#">draft-ietf-core-senml</a>	-11 <i>new</i>	2017-10-30	Active	
<a href="#">draft-ietf-core-sid</a>	-02 <i>new</i>	2017-10-30	Active	
<a href="#">draft-ietf-core-yang-cbor</a>	-05	2017-08-08	Active	
<i>IESG Processing:</i>				
<a href="#">draft-ictf-core-coap-tcp-tls</a>	-10 <i>new</i>	2017-10-30	IESG Evaluation::AD Followup	
<a href="#">draft-ictf-core-links-json</a>	-09	2017-07-03	IESG Evaluation::AD Followup	
<i>Published:</i>				
<u>Draft name</u>	<u>Rev.</u>	<u>Dated</u>	<u>Status</u>	<u>Obsoleted by/(Update)</u>
<a href="#">draft-ictf-core-block</a>	-21	2016-07-08	RFC 7959	
<a href="#">draft-ictf-core-coap</a>	-18	2013-06-28	RFC 7252	(RFC 7959)
<a href="#">draft-ictf-core-ctch</a>	-04	2016-11-14	RFC 8132	
<a href="#">draft-ictf-core-groupcomm</a>	-25	2014-09-12	RFC 7390	
<a href="#">draft-ietf-core-http-mapping</a>	-17	2016-11-28	RFC 8075	
<a href="#">draft-ietf-core-link-format</a>	-14	2012-06-01	RFC 6690	
<a href="#">draft-ietf-core-observe</a>	-16	2014-12-30	RFC 7641	



The document name you specified, "*draft-\*core-*", matched multiple documents:  
(There were 226 matches, and the list has been truncated. But if you want, you can [see them all.](#))

[sort by date](#) [sort by name](#)

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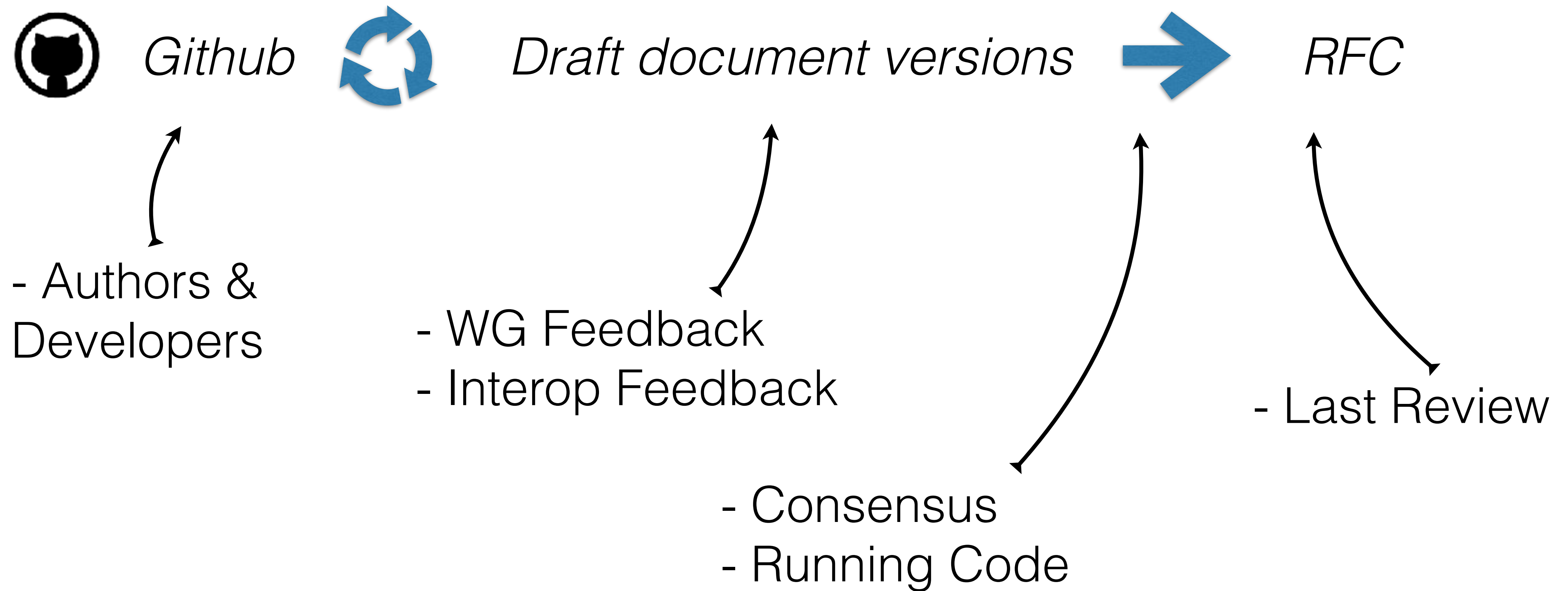


# Possible LWM2M Additions



- *[RFC8132]* Support of PATCH/FETCH methods, it'd be greatly beneficial for firmware upgrade or observing relatively large sets of resources.
- *[RFC7641]* Support of observe between LWM2M Clients in order to subscribe to updates from one another.
- *[RFC8075]* In cases of GWs that need to implement a HTTP to CoAP proxy.
- *[RFC7049]* CBOR formatting instead of TLV.
- *[I-D.ietf-core-coap-tcp-tls]* **(updated)** outlines the changes required to use CoAP over TCP, TLS, and WebSockets transports.
- *[I-D.ietf-core-resource-directory]* **(updated)** Other than traditional LWM2M, CoAP's in-built discovery would be beneficial to support device-to-device cases. New version just published, <https://tools.ietf.org/html/draft-ietf-core-resource-directory-12>
- *[I-D.ietf-core-object-security]* **(updated)** For systems in which endpoints work behind a gateway or use LWM2M for managing the gateways, it might be good to implement other types of cryptographic protection than TLS/DTLS.

# Ways of Working





# Assorted References

REST	<a href="https://www.ics.uci.edu/~fielding/pubs/dissertation/rest_arch_style.htm">https://www.ics.uci.edu/~fielding/pubs/dissertation/rest_arch_style.htm</a>
CoAP	<a href="https://tools.ietf.org/html/rfc7252">https://tools.ietf.org/html/rfc7252</a>
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CoRE RD	<a href="https://datatracker.ietf.org/doc/draft-ietf-core-resource-directory/">https://datatracker.ietf.org/doc/draft-ietf-core-resource-directory/</a>
LWM2M	<a href="https://github.com/OpenMobileAlliance/">https://github.com/OpenMobileAlliance/</a>
CoMI	<a href="https://tools.ietf.org/wg/core/draft-ietf-core-yang-cbor/">https://tools.ietf.org/wg/core/draft-ietf-core-yang-cbor/</a>
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IPSO	<a href="http://ipso-alliance.github.io/pub/">http://ipso-alliance.github.io/pub/</a>
LWM2M to YANG	<a href="https://tools.ietf.org/html/draft-vanderstok-core-yang-lwm2m-00">https://tools.ietf.org/html/draft-vanderstok-core-yang-lwm2m-00</a>
OSCOAP	<a href="https://tools.ietf.org/wg/core/draft-ietf-core-object-security/">https://tools.ietf.org/wg/core/draft-ietf-core-object-security/</a>
CoAP for LWM2M	<a href="https://tools.ietf.org/html/draft-jimenez-t2trg-coap-functionality-lwm2m">https://tools.ietf.org/html/draft-jimenez-t2trg-coap-functionality-lwm2m</a>